



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,262	12/13/2005	Wolfgang Ehrfeld	100717-669-WCG	3593
27386 7590 04/24/2009 NORRIS, MCLAUGHLIN & MARCUS, P.A. 875 THIRD AVE 18TH FLOOR NEW YORK, NY 10022				
EXAMINER SOOHOO, TONY GLEN				
ART UNIT		PAPER NUMBER		
1797				
MAIL DATE		DELIVERY MODE		
04/24/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/535,262

Applicant(s)

EHRFELD ET AL.

Examiner

Tony G. Soohoo

Art Unit

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/13/2005, 1/16/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3-6, 10-11, 14 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 are narrative to the manner of the flow of the fluid in the device (i.e. operation of flow) and does not distinctly point out and positively claim the relative arrangement of the structural elements in cooperation relative to one another to produce the recited flow of material.

Claim 4, "arranged to one another in such a way" is unclear in the structural connection and relationship of the slot opening, aperture, and slotted plate.

Claim 5 recites the operation of the flow through the device "fluid phases come in contact with one another" and is unclear as to what further structural is being afforded to the slot openings in the aperture plate.

Claim 6 "geometric form and alignment" ... "promote the production of secondary effect". The claim is unclear in the particular geometry, form, or alignment which is capable to perform the "[promotion] of secondary effects". The claim is unclear in meets and bounds of scope of the "secondary effects".

Claim 10, points to the manner of making (i.e. machined out of plates) of the apparatus, and does not clearly point out what physical element is provided upon the slotted plate of the instant apparatus claim in its manner of construction.

Claim 10, "structures are applied", the claim is unclear in what physical element is meant by "structures".

Claim 11, the claim is unclear in the physical meets and bounds of the relative relationship between the elements in the phrase "by means of suitable arrangement of one or more slotted plates and/or aperture".

Claim 11, states 'an outlet opening of another fluid'. It appears to state that "another fluid" has a physical structure of an "outlet opening". A fluid does not inherently have "an outlet opening". For examination purposes, the claim is read, as best understood, to mean that the arrangement of plates has an outlet.

Claim 17 recites different techniques in which the plates have been produced in manufacture of the plate and does not point out any further patentable limitation of structure to the plate itself within this instant apparatus claim.

Claim 14 is unclear in the intended patentable scope by limitation of "optionally rotated through 90 (degrees)". Since the claim recites "the slots are arranged at any desired angle to one another", and the term "optionally" does not require the recited angle configuration, it is unclear to the meets and bounds of protection to be afforded by the recitation of 90 degrees.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 9-14, 16-20, 25, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Ashmead et al 5534328.

The Ashmead reference discloses a plurality of stacked microplates see figure 1, with an inlet portion 20/24 and outlet ports 30/34 which is capable to receive two fluid phase for fluid processing, where there is a stack at least one slotted plate 1100 (fig 16) having plural slot openings 90-1' through 90-8', and an aperture plate 1000 having plural offset parallel aperture slots 90C1'/ 90C2' arranged above the slotted plate 1100 whose slots are continuous openings along the each length of 90-1' through 90-8'. Also the slot openings and the aperture slots are arranged at any relative angle, in this case perpendicular to one another (claims 1-2, 13, 14, 18, and 25).

Regarding claims 3-6: Note that the fluid enters from an above aperture 87, 90C1 to be fed into the slots openings and enters an opening 90C2' in the above plate 1000. Note that the fluid phases may contact with one another in the slot openings in the aperture plate 1000. Note that the geometric form and alignment of the slot openings 90-1' through 90-8' as seen in figure 16 would inherently promote secondary effects in fluid motion and cooperation.

Regarding, Claim 9, note that figure 14, the plate 900 provides additional of slotted plates (88C) and aperture plates 1000 (aperture chamber 89, fig 14), arranged directly above one another and from the plates of fig 16 and 13).

Regarding claims 10, 17 and 27, the manner of making the plates or making of the slots does not appear to differentiate the slotted plate element in a structural sense as long as a slot is formed. Therefore, issues as to how the slot is made, i.e. by laser or LIGA techniques has been provided with little, if any, patentable weight to the structural feature of the apparatus claims.

Regarding claim 11, note the parallel arrangement of the slots and the configuration of the aperture is deemed "suitable" in arrangement to lead the fluid to an outlet.

Regarding claim 12, note that the channels in the section 10 may be considered as a mixer chamber above the aperture plate 1000 (or 1000 of figure 16).

Regarding claims 16 and 19, note the materials in which the plates are formed include metal, or materials which are compatible with the specific chemical process and joined together with a means such as a weld or adhesive, column 6, lines 30-68.

Regarding claim 20, note that the slot openings are parallel branches and the aperture slots form a T-shaped branch (fig 16).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ashmead et al 5534328.

Regarding claim 26 note that the Ashmead reference discloses that the channel cross section of the device is of the range of "from *about* 10 to *about* 5000 micrometers" (emphasis added) column 2, lines 65-66, however is silent as to the slot width less than 500 micrometers (claim 15) or in particular the slot width being less than 10 micrometers (claim 26/15).

Whereas the phrase "about 10 micrometers" provides a variance from the value of 10, and whereas the width of a channel is an effective variable in the amount of fluid which may be processed by the channel or slot, it would have been obvious to make and use the corresponding Ashmead device having the *slot* opening channel width sized in the lower range of 10 micrometers or less so as to be capable to utilize smaller fluid samples in the processing step thereby minimizing waste of fluid. Since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

7. Claims 7, 8, 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ashmead et al 5534328 in view of Lowe et al 2004/0027915.

The Ashmead reference discloses all of the subject matter as discussed above. However the Ashmead reference does not show the slots being in an oblique in relation to one another (claim 7); the slots having a shape of a funnel or lobe (claim 8); or having a housing (claims 21-24) to contain the channels.

The Lowe et al reference (Lowe) discloses that a micro fluidic device may have multiple feed slots 2,2,2, 3,3,3 (figures 1b,2,3) which may be formed in the arrangement of being oblique (fig 1b), or funnel shaped or lobed shaped (figs 2,3).

Additionally a housing is provided which may hold the plates together. "The resulting stack made up of the plates 21, 20, 26, and 22 may be lodged in a mixing housing equipped with suitable fluid connections for the supply of two fluids and the removal of the fluid mixture. Furthermore, a compression force may be applied through the housing onto the stack of plates in order to provide a fluidly tight connection. " [0059].

In view of the showing of the configuration of the shapes of oblique, funnel or lobe shapes of channels which may enhance fluid current, in light of the knowledge gleaned by the prior art, it would have been obvious to a person having ordinary skill in the art to modify the parallel slot configuration of Ashmead with an oblique or funnel/lobe shape to the slots so as to provide an enhanced

shape for urging fluid current interaction between the fluids within the chemical process.

Furthermore, in light of the knowledge gleaned by the prior art that a housing may be provide to hold stacks of plates together, it would have been obvious to a person having ordinary skill in the art to provide for a housing so that the plates and its channels are more easily secured together within a single unified construction.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US patent 7223364, US patent 4222671 and US patent 5016707.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony G. Soohoo whose telephone number is (571) 272 1147. The examiner can normally be reached on 8AM-5PM, Tues-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

Tony G Soohoo
Primary Examiner
Art Unit 1797